



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,535	08/23/2001	Yaron Haviv	P-3463-US	7817

27130 7590 12/09/2004

EITAN, PEARL, LATZER & COHEN ZEDEK LLP  
10 ROCKEFELLER PLAZA, SUITE 1001  
NEW YORK, NY 10020

EXAMINER
----------

KWON, MIN S

ART UNIT	PAPER NUMBER
----------	--------------

2142

DATE MAILED: 12/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/934,535

Applicant(s)

HAVIV, YARON

Examiner

Min S. Kwon

Art Unit

2142

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08-23-2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 09-06-2002.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1-51 have been examined.

***Priority***

2. The applicant claims priority from provisional application no. 60/227362, files on 8/24/2000.

***Specification***

3. The disclosure is objected to because of the following informalities:
  - a. Brief Summary of the Invention is missing.
  - b. Background of the Invention should be separated into two sections: Field of the Invention and Description of the related art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 27-31, 40, and 51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Art Unit: 2142

- a. Regarding claim 27, the meaning of “converting” is not clear. Claim 25 discloses “converting” a session of packet-oriented traffic into transactions comprising remote direct memory access messages. However, claim 27 recites that “converting” comprises of *sending* the converted RDMA message, as well. The claim is indefinite because the broadest reasonable interpretation of “converting” does not fit the usage of the word “converting” as recited in the claim.
- b. Claims 28-31 are rejected because they are dependent on claim 27. Any claims not specifically addressed are rejected by virtue of its dependency.
- c. Regarding claim 40 and 51, the phrase "socket transactions" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "socket transactions"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

*Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of what was well known at the time the invention was made.

- a. As to claim 25, Lamberton does not disclose a method for converting a session of packet-oriented traffic into transactions comprising remote direct memory access message.

However, the prior art RDMA over TCP/IP is disclosed by the applicant (page 3, 3<sup>rd</sup> paragraph, next to last sentence). In order to send RDMA requests over TCP/IP, the packets must first be converted into RDMA requests.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Lamberton to include the sending of packet-oriented traffic into transactions comprising remote direct access messages, because remote direct access messages bypass the CPU and works directly on the remote computer's memory, thereby unencumbering the CPU from extra processing (hence, faster).

- b. As to claim 26, RDMA over TCP/IP works with transport control protocol (TCP) traffic.

8. Claims 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton et al in view of U.S. Patent No. 6,151,688 to Wipfel et al, Weinberg and Sathaye.

- a. As to claim 1, Lamberton discloses a method where a router processes a connection request from a first computer (fig. 1); a router sending an

acknowledgment for said connection request to said first computer so that a direct connection can be established between said first computer and said second computer (fig. 1, element 135; col. 5, lines 8-11), but fails to teach that the computers have multi-channel reliable software and fails to teach that the router select said second computer from a group of computers according to information in said connection request, said information comprising opaque data.

Wipfel discloses methods, systems and devices for managing resources in a computing cluster utilizing a multi-channel reliable hardware in a system area network (SAN) (fig. 1). Weinberg and Sathaye disclose a layer-4 switch with an “ability to look inside packets and make sophisticated traffic flows based on information contained in the HTTP header” (Weinberg, page 1, 3<sup>rd</sup> paragraph, lines 3-6).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have included the use of multi-channel reliable hardware and network because it has much lower latency and much higher bandwidth (Wipfel, col. 1, lines 65-67). It would also have been obvious to one having ordinary skill in the art at the time of the invention to include the routing of traffic based on information in said connection request, because doing so optimizes web data center infrastructures, minimizes application response times and improves overall traffic control (Sathaye, 2<sup>nd</sup> paragraph, lines 3-4).

- b. As to claim 5, it is rejected for similar reasons as claim 1, except that it recites “upstream traffic” instead of requests. A request *is* upstream traffic.

- c. As to claim 11, it is rejected for similar reasons as claim 1, except that claim 11 teaches the use of remote direct memory access, having a router process non-remote-direct-memory-access traffic from said second computer to said first computer over said connection. Use of multi-channel reliable hardware and network such as system area network as disclosed by Wipfel inherently includes the use of RDMA. A router inherently looks at only portion of incoming data in order to make routing decisions, therefore, it would process information only relevant to routing.
- d. As to claim 17, Lamberton discloses a method having a router transfer transaction traffic between a first computer and a second computer while processing only a portion of said transaction traffic (col. 6, lines 32-36).
- e. As to claim 32, it is rejected for similar reasons as claim 1 and 5 above, except it discloses a router being able to process transactions. Layer-4 routers manage and switch application sessions, not just individual packets (Sathaye, page 1, 3<sup>rd</sup> paragraph, first sentence).
- f. As to claims 2, 6, 12, transport layer is layer 4, which is the layer in which layer-4 routers operate.
- g. As to claims 4, 10, 16, 24, 31, 35, it is an inherent function of layer-4 routers to select a second computer from a group of computers according to load-balancing considerations.
- h. As to claims 8, 14, 22, 38, it is an inherent function of a layer-4 router to gather information on traffic in order to make routing decisions.

- i. As to claims 9, 15, 23,30, they are rejected for similar reasons as claim 1 (in regards to choosing a second computer from a group of computers according to information in traffic).
  - j. As to claim 18, Lamberton discloses a method wherein said portion comprises commands and command parameters of said transaction traffic (col. 6, lines 32-36). Lamberton discloses forwarding of initial requests issued by the Web browser when initializing a session. Applicant discloses in the specification that a command may be a HTTP request (page 12, bottom of page).
  - k. As to claim 19, Lamberton discloses a method wherein said portion comprises a connection request from said first computer to said second computer (col. 6, lines 32-36). An initial request for session initialization is a connection request.
  - l. As to claim 20, a request that is sent is inherently an upstream traffic.
  - m. As to claims 39, Wipfel discloses that system area network include asynchronous transfer mode (ATM) and FibreChannel (col. 6, lines 26-28):
9. Claims 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of U.S. Patent No. 6,151,688 to Wipfel et al, Weinberg and Sathaye, as applied to claims 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 above, and further in view of U.S. Patent No. 6,333,929 to Drott et al.
- a. As to claim 41, it meets all the limitations of claim 1, except for a proxy being able to receive packet-oriented traffic from a client computer, to convert a session



of said packet-oriented traffic into transactions comprising remote direct memory access messages, and to send said transactions to one of said server computers.

Drottar teaches a method for transmitting a packet, including information describing a bus transaction to be executed at a remote device. The bus transaction includes RDMA operations (col. 12, lines 25-45). The method includes wrapping the transaction in a packet for transmission over a packet over the network (col. 2, lines 5-7). In other words, the transaction is converted into RDMA transaction, to be executed by the remote host.

The use of a proxy is old and well known in the art. Therefore, it would have been obvious at the time of the invention to have further modify the invention of Lamberton to include a proxy that is able to convert the traffic into transactions comprising RDMA access messages, because the use of a proxy is an easy and convenient way of adding functionality without having to modify existing systems.

- b. As to claim 42, Lamberton in combination with Wipfel, Weinberg and Sathaye does not explicitly teach that the packet-oriented traffic is transport control protocol.

However, as mentioned in claim 25 above, the applicant disclosed prior art RDMA over TCP/IP, which works with transport control protocol.

Therefore, it would have been obvious at the time of the invention to further modify the invention of Lamberton to use RDMA over TCP/IP, which is one of multi-channel reliable hardware and network as disclosed by the applicant.

10. Claims 3, 7, 13, 21, 28, 29, 34, 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of Wipfel et al, Weinberg and Sathaye, as applied to claims 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 above, and further in view of Cisco Systems Inc.

- a. As to claims 3, 7, 13, 21, 28, 29, 37, the combined teaching of Lamberton, Wipfel, Weinberg and Sathaye shows substantial features of the claimed invention (discussed above), but it fails to disclose a router that filters said connection request, portion and transaction according to a predefined policy.

However, Cisco Systems disclose a policy-based router, which is able to route traffic according to a predefined policy, or in other words, filter traffic (page 1, 1<sup>st</sup> paragraph).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the invention suggested by Lamberton in view of Wipfel et al, Weinberg and Sathaye in combination with the policy-based routing disclosed by Cisco Systems Inc., because “in today’s high performance internetworks, organizations need the freedom to implement packet forwarding and routing according to their own defined policies in a way that goes beyond traditional routing protocol concerns” (Cisco, page 1, 1<sup>st</sup> paragraph, 1<sup>st</sup> sentence). Additionally, in regards to claim 29, as mentioned in claims 8, 4 and 22 above, gathering information is an inherent functionality of a layer-4 router.

- b. As to claim 34, the combined teaching of Lamberton, Wipfel, Weinberg and Sathaye show substantial features of the claimed invention (discussed above), but it fails to teach that one or more routers is able to direct said transactions among said routers according to information in said transactions.

Cisco Systems teach a method and apparatus for policy-based routing, where next hop router is specified (page 3, 2<sup>nd</sup> column, 6<sup>th</sup> paragraph). Layer-4 routers, also referred to as Web switches, e-commerce switches or content-aware switches, have the ability to look inside packets and make sophisticated forwarding decisions based on information contained in the HTTP header (Weinberg, page 1, 3<sup>rd</sup> paragraph); layer-4 switches manage and switch application sessions, not just individual packets (Sathaye, page 1, 3<sup>rd</sup> paragraph, first sentence).

By combining the policy-based routing with the layer-4 routers, it would have been obvious to direct transactions to other routers according to information in said transactions. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the combined invention of Lamberton, Wipfel, Weinberg and Sathaye with the policy-based routing disclosed by Cisco Systems Inc., because “in today’s high performance internetworks, organizations need the freedom to implement packet forwarding and routing according to their own defined policies in a way that goes beyond traditional routing protocol concerns” (Cisco, page 1, 1<sup>st</sup> paragraph, 1<sup>st</sup> sentence).

11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of Wipfel et al, Weinberg and Sathaye, as applied to claims 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 above, and further in view of U.S. Patent No. 6,389,017 to Patel et al.

- a. As to claim 33, the combined teaching of Lamberton, Wipfel, Weinberg and Sathaye show substantial features of the claimed invention (discussed above), but it fails to disclose that routers are arranged in a cascaded manner.

Patel discloses a multi-link routing algorithm and discloses that multi-port routers may be cascaded (col. 1, lines 32-33).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the combined invention of Lamberton, Wipfel, Weinberg and Sathaye with the teaching of Patel to arrange routers in a cascaded manner, because cascading routers allows for the creation of arbitrary network topologies (col. 1, lines 32-33).

12. Claims 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of Wipfel et al, Weinberg and Sathaye, as applied to 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 above, and further in view of U.S. Patent No. 6,788,692 to Boudreau et al.

- a. As to claim 36, the combined teaching of Lamberton, Wipfel, Weinberg and Sathaye show substantial features of the claimed invention (discussed above), but it fails to teach that one or more routers is able to direct said transactions among said routers according to load-balancing considerations.

Boudreau teaches a method and apparatus to balance load in a cluster of

switches in a network (abstract, col. 1, lines 50-57; col. 2, lines 43-50). Layer-4 routers manage and switch application sessions, not just individual packets (Sathaye, page 1, 3<sup>rd</sup> paragraph, first sentence).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the combined invention of Lamberton, Wipfel, Weinberg and Sathaye with the teaching of Boudreau to direct transactions based on load-balancing considerations because load-balancing increases performance.

13. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lamberton in view of Wipfel et al, Weinberg and Sathaye, in view of Cisco Systems Inc., as applied to 1-2, 4-6, 8-12, 14-20, 22-24, 30-32, 35, 38-39 and 3, 7, 13, 21, 28, 29, 34, 37 above, and further in view of U.S. Patent No. 6,067,580 to Aman et al.

- a. As to claim 40, the combined teaching of Lamberton, Wipfel, Weinberg and Sathaye show substantial features of the claimed invention (discussed above), but it fails to teach that the transactions are from a group including: database transactions, remote procedure call transactions, storage-access transactions, file-access transactions, and socket transactions.

Aman discloses an invention which provides a way for routing RPC requests to the “best” server that may be available in the system, or in a network of systems (col. 2, lines 32-34).

The applicant discloses an exemplary transaction in the specification (page 6, last two paragraphs). The applicant explains that the routers examine the

command in the transaction, and if the command complies with a predefined policy, the router sends the command and the parameters to the server. From this point on, communication takes places directly between the client and the server without the intervention of a router (page 7, 1<sup>st</sup> and 2<sup>nd</sup> paragraphs). In light of the applicant's specification, RPC would be routed in the same way these other transactions are routed. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the combined invention of Lamberton, Wipfel, Weinberg, Sathaye and Cisco Systems with the teaching of Boudreau to direct RPC transactions, because RPC is commonly used in distributed computing.

### *Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 6,742,051 to Bakshi et al disclose an interface between a software application and a hardware device transferring data between the software application and a network, including the use of RDMA.
- b. U.S. Patent No. 6,697,878 to Imai discloses a computer having a remote procedure call mechanism or an object request broker mechanism in a distributed computing environment. It uses RDMA unit for transferring the data read out by the data readout unit.

- c. U.S. Patent No. 6,212,184 to Venkatachary et al disclose a fast, scalable method and devices for layer-4 switching in a router.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Min S. Kwon whose telephone number is (571) 272-7216. The examiner can normally be reached on 8 AM - 4:30 PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack B. Harvey can be reached on (571) 272-3896. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

\*\*\*

THONG VU

